

9 (a) Show that the first two terms of the binomial expansion of $\sqrt{4 - 2x^2}$ are

$$2 - \frac{x^2}{2}$$

[2 marks]

9 (b) State the range of values of x for which the expansion found in part (a) is valid.

[2 marks]

9 (c) Hence, find an approximation for

$$\int_0^{0.4} \sqrt{\cos x} \, dx$$

giving your answer to five decimal places.

Fully justify your answer.

[4 marks]

9 (d) A student decides to use this method to find an approximation for

$$\int_0^{1.4} \sqrt{\cos x} \, dx$$

Explain why this may not be a suitable method.

[1 mark]